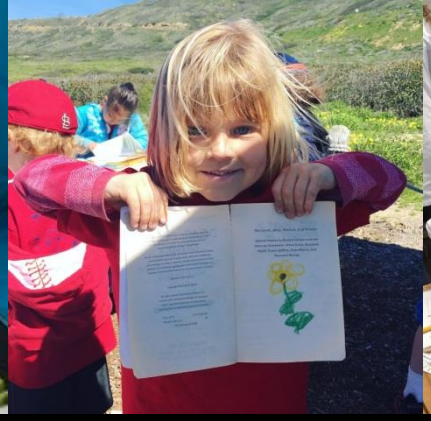



Talking change:
Climate science & adaptation

Dani Boudreau ♦ May 2018 ♦ TRNERR

Temperature

- Heat waves
- Warmer nights*

Salvador Dali, *The Persistence of Memory (1931)*

Sea level rise

Jenn Hales, *Summer in the City*

- Storms +
- High tide +
- El Nino*

Storms & floods

Stanislav Sidorov, *Rain in the City*

- More rain during storm events*

Droughts

Helen Klebesadel, *Earth Element: Drought*

- More time between rain events*

Freshwater

Richard Claremont, *Refresh*

- Decreased snowpack
- Timing of snowmelt
- Increased evaporation*

Wildfires

Ricardo Chavez-Mendez, *Fire Line 2*

- Warmer spring temps
- Drier vegetation
- Santa Ana winds*

Public health

Norman Rockwell, *Doctor* (1958).

- Extreme heat
- Poor air quality
- Wildfires
- Infectious diseases*

Habitats & wildlife

Diane McClary, *Joshua Tree.*

- Habitat range shifts
- Invasives
- Phenological mismatches
- Pests & pathogens
- Habitat loss
  - Tide pools & estuaries
  - Alpine*

HOW WE’RE ADAPTING…

Climate Understanding & Resilience in the River Valley (CURRV)

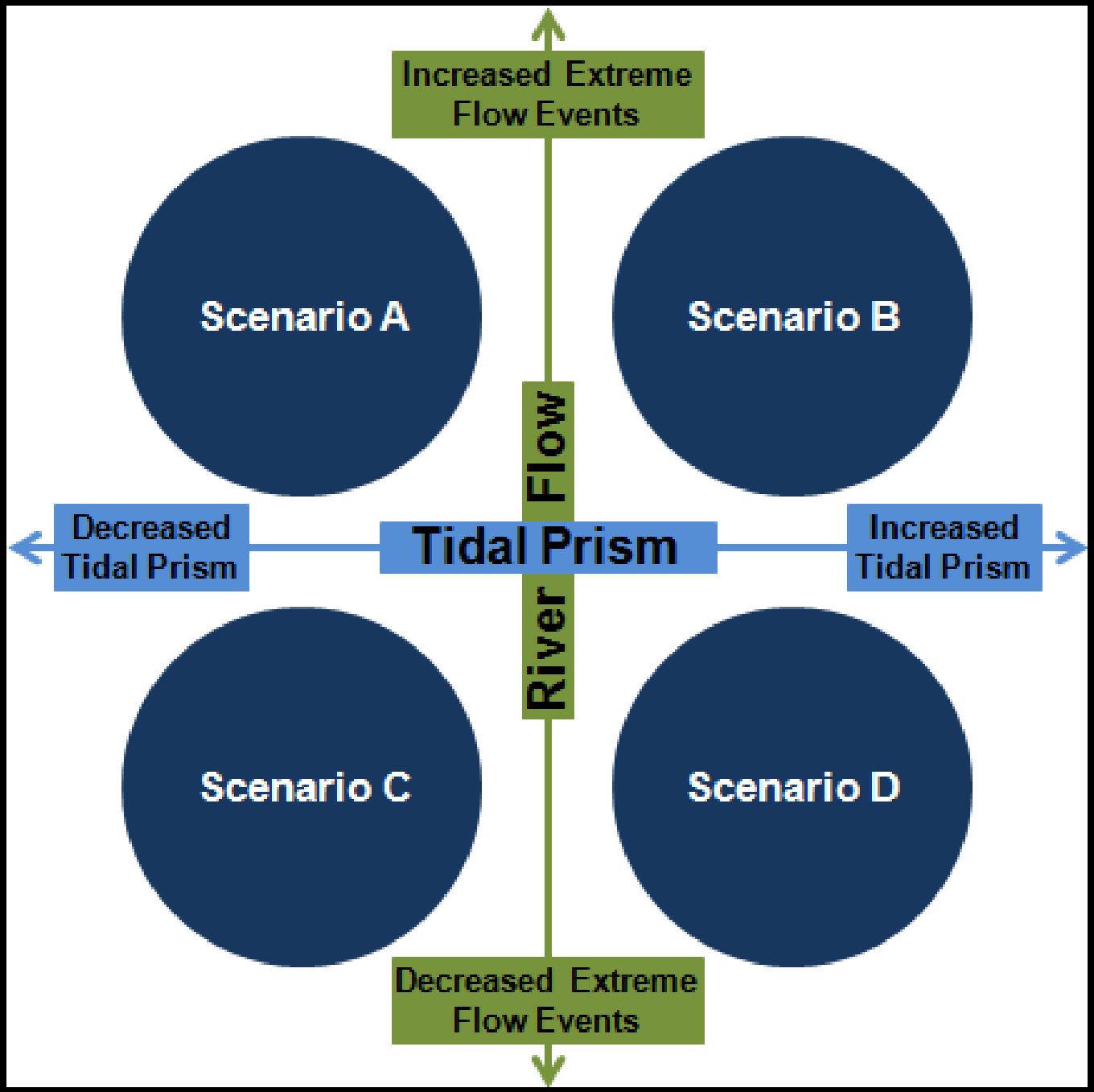
Scenario planning

Visualizing the Future

CURRV scenarios defined

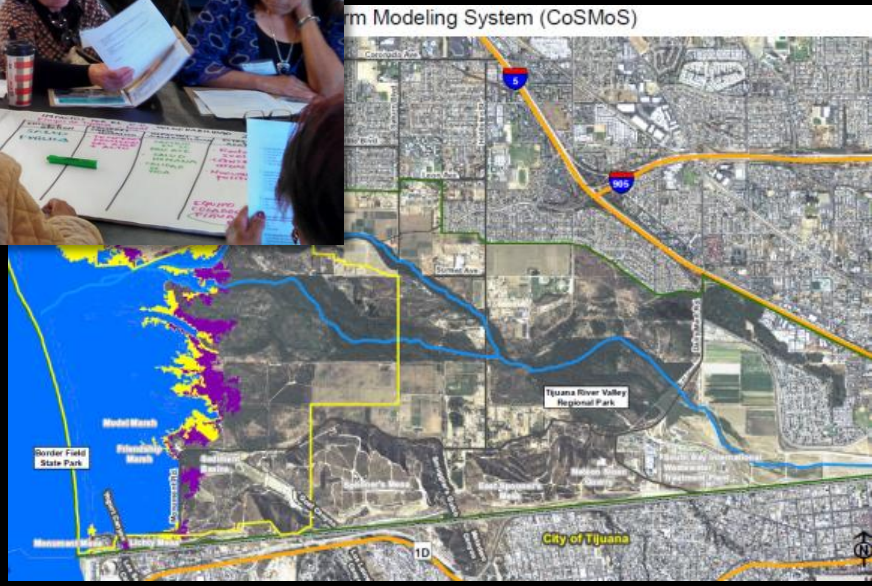
- Each scenario is a
  - Possible future state of the world
- Plausible
  - Not forecasts or predictions
- No specific time horizon

Sea level rise & riverine flooding


Increased Extreme Flow Events
Scenario A
Scenario B
Flow
Decreased Tidal Prism
Tidal Prism
Increased Tidal Prism
River
Scenario C
Scenario D
Decreased Extreme Flow Events

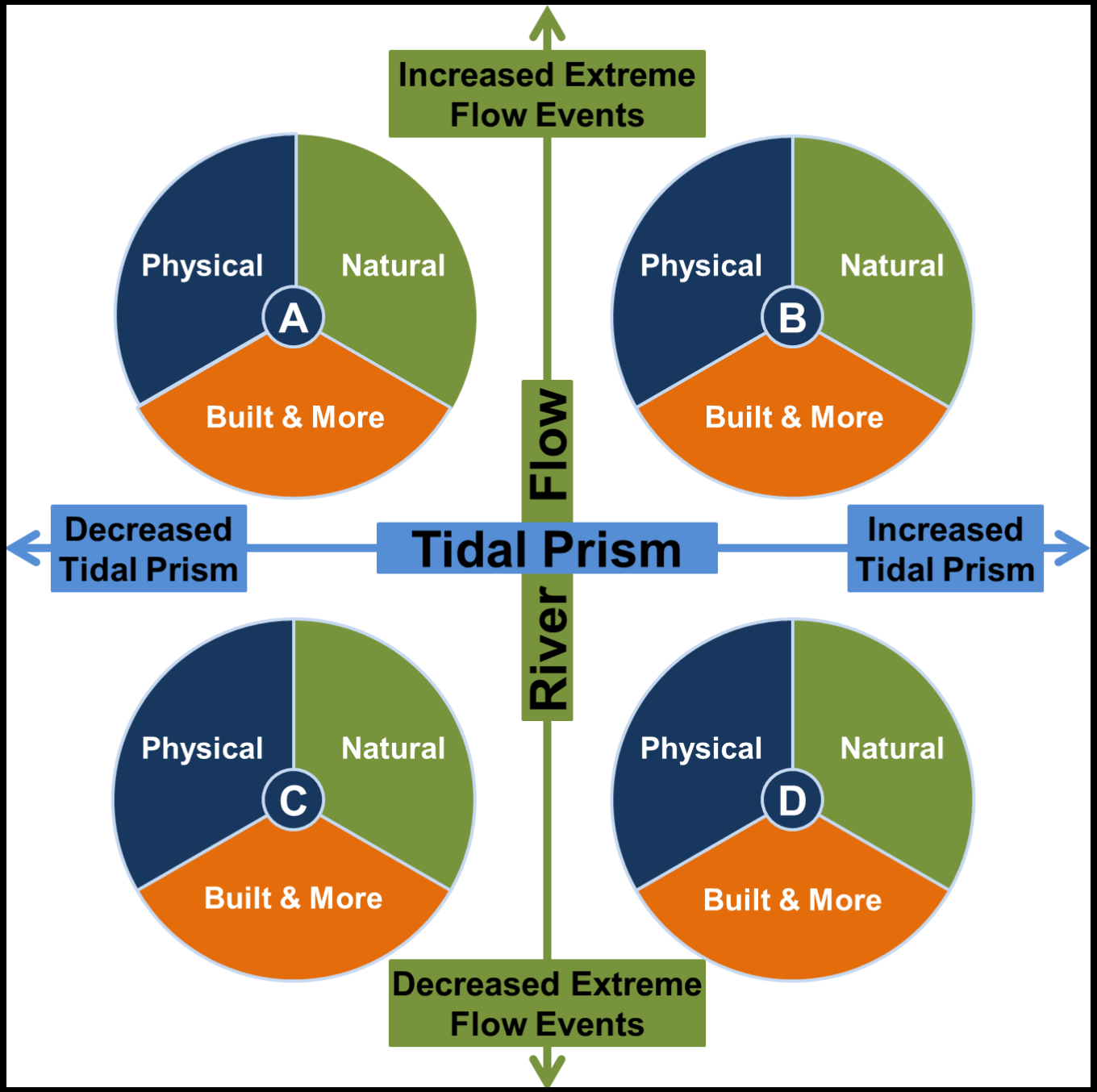
History

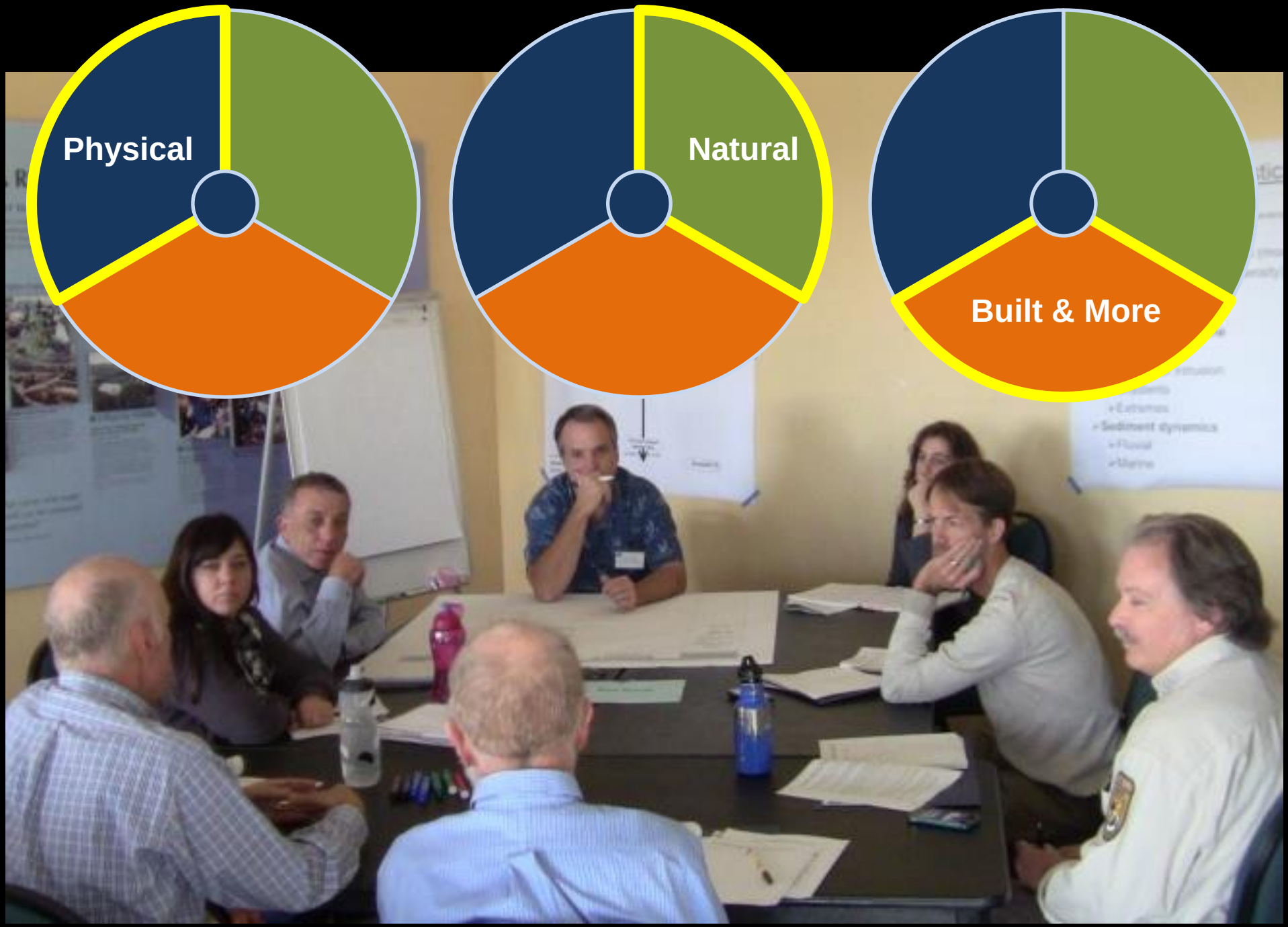
Experience

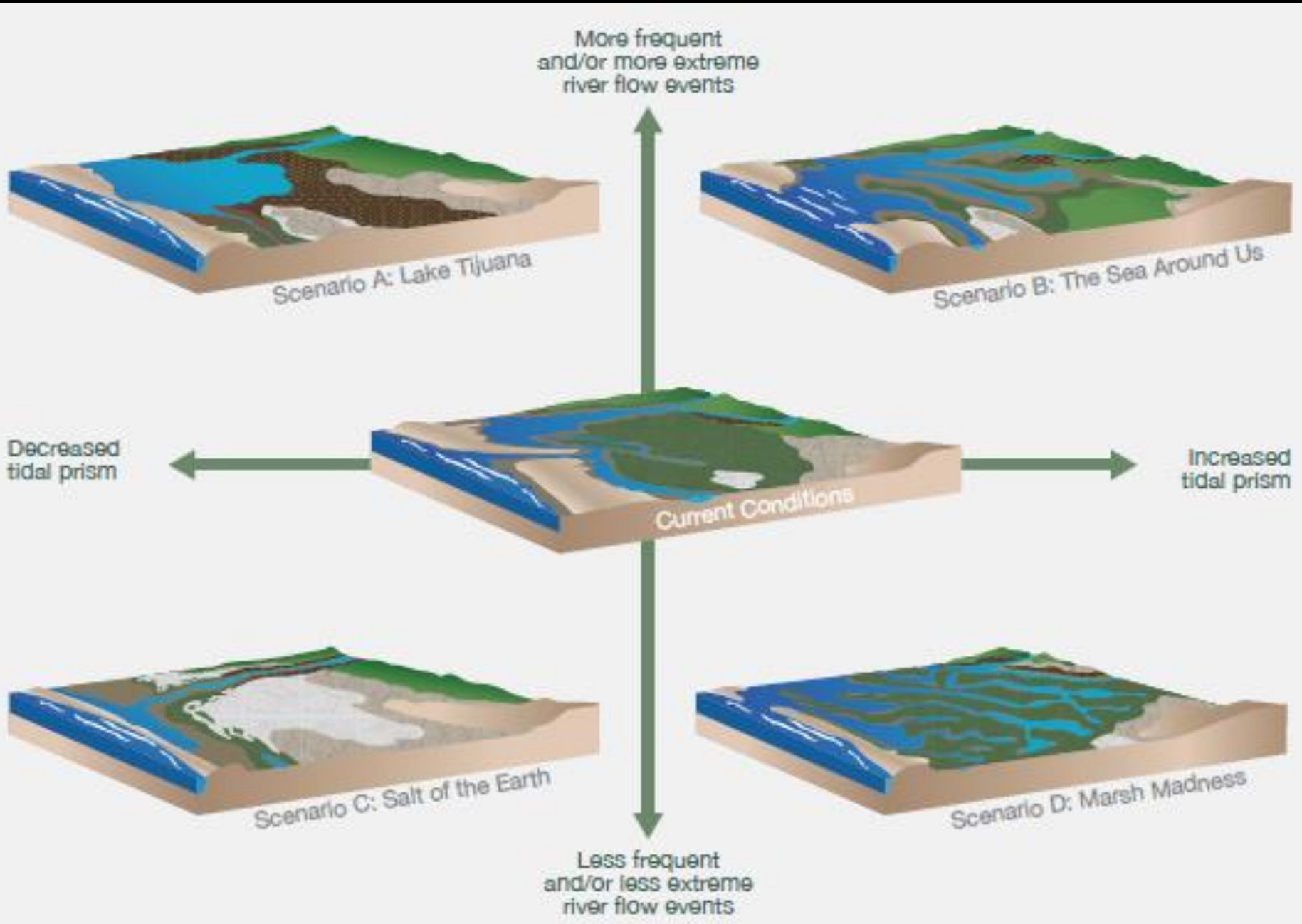


Science

Qualitative & Quantitative


Increased Extreme Flow Events
Physical
Natural
A
Built & More
Physical
Natural
B
Built & More
Flow
Decreased Tidal Prism
Tidal Prism
Increased Tidal Prism
River
Physical
Natural
C
Built & More
Physical
Natural
D
Built & More
Decreased Extreme Flow Events


Physical
Natural
Built & More


More frequent
and/or more extreme
river flow events
Scenario A: Lake Tijuana
Scenario B: The Sea Around Us
Decreased
tidal prism
Current Conditions
Increased
tidal prism
Scenario C: Salt of the Earth
Scenario D: Marsh Madness
Less frequent
and/or less extreme
river flow events

Changes to the Physical Environment

River-Ocean Connection & Water Residence Time
The river mouth is usually closed, which traps water in the system for long periods of time. This increases the accumulation of nutrients and contaminants in aquatic habitats.

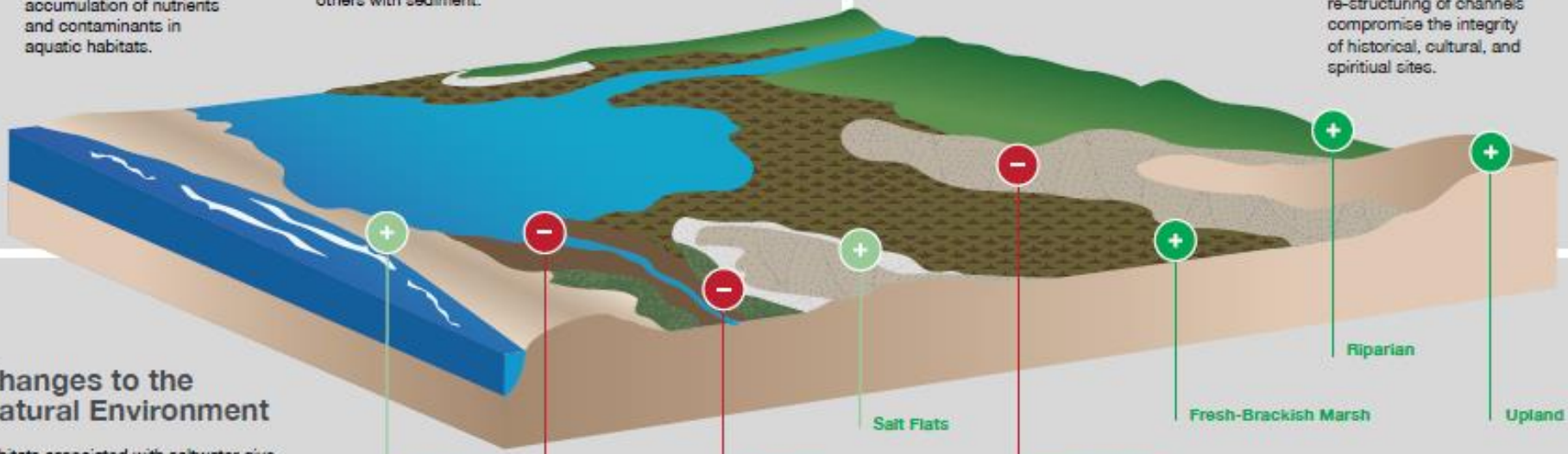
Flooding, Inundation, & Sedimentation
Riverine flooding impacts the Valley as water ponds behind the closed river mouth. There is the potential for restructuring of the Valley as storm waters carve new channels and fill others with sediment.

Surface Water & Groundwater Salinity
Increased freshwater influence is experienced during mouth closure, which may recharge groundwater supplies.

Potential Management Challenges

Transportation
Access in the Valley is frequently impaired by sedimentation, standing water, and flooding. This obstructs roads, bridges, trails, and evacuation routes; and leads to a need for increased flood preparedness, especially among emergency responders.

Cultural & Historical Resources
High rates of erosion and re-structuring of channels compromise the integrity of historical, cultural, and spiritiual sites.



Changes to the Natural Environment

Habitats associated with saltwater give way to those associated with freshwater, due to ponding behind the closed mouth. Sediment loading outpaces sea level rise and upland habitats increase.

Science

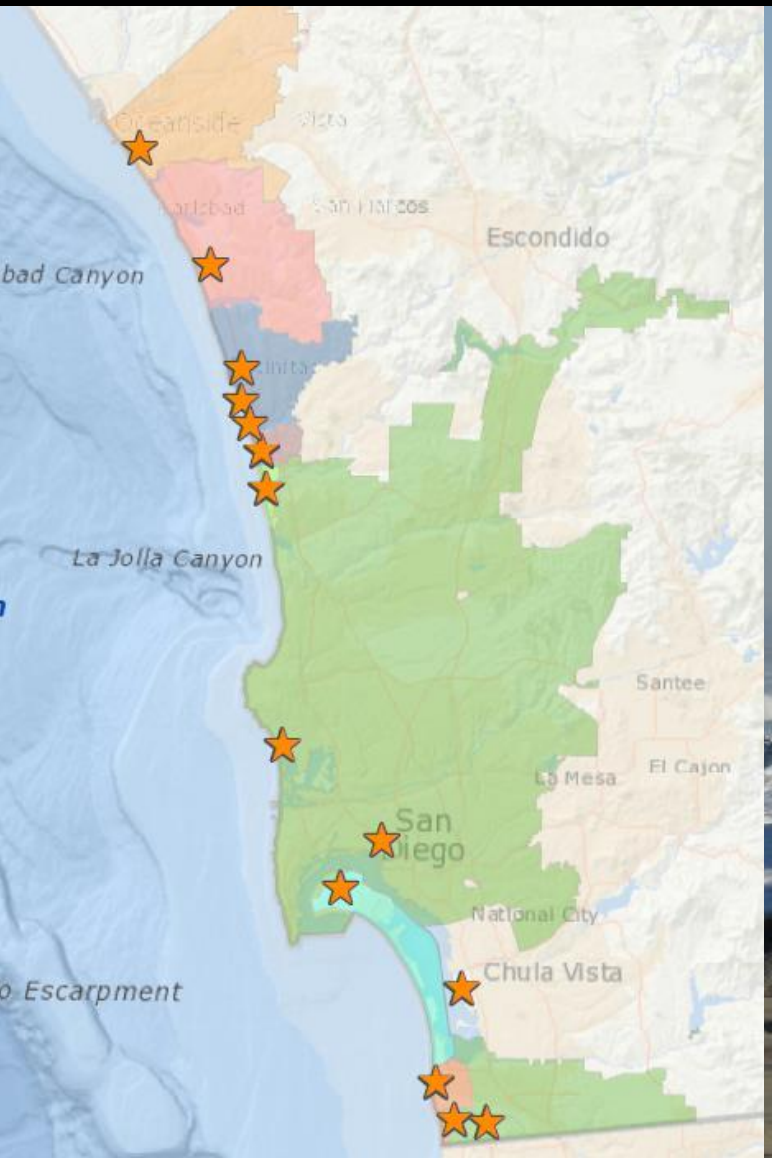
Experience

Dialogue

Uncertainty

Multiple variables

Regional planning



Transferable

TEACHING THE FACTS…

Key messages

- Earth’s climate is changing
- Human activities are responsible
- Effecting our society and world
- Humans can take action to reduce impact

Communication challenges

- Political controversy
- Future problem
- Slow change
- Fear & feeling powerless
- Science communication

Culture of silence

84% of San Diego County residents believe climate change is happening*

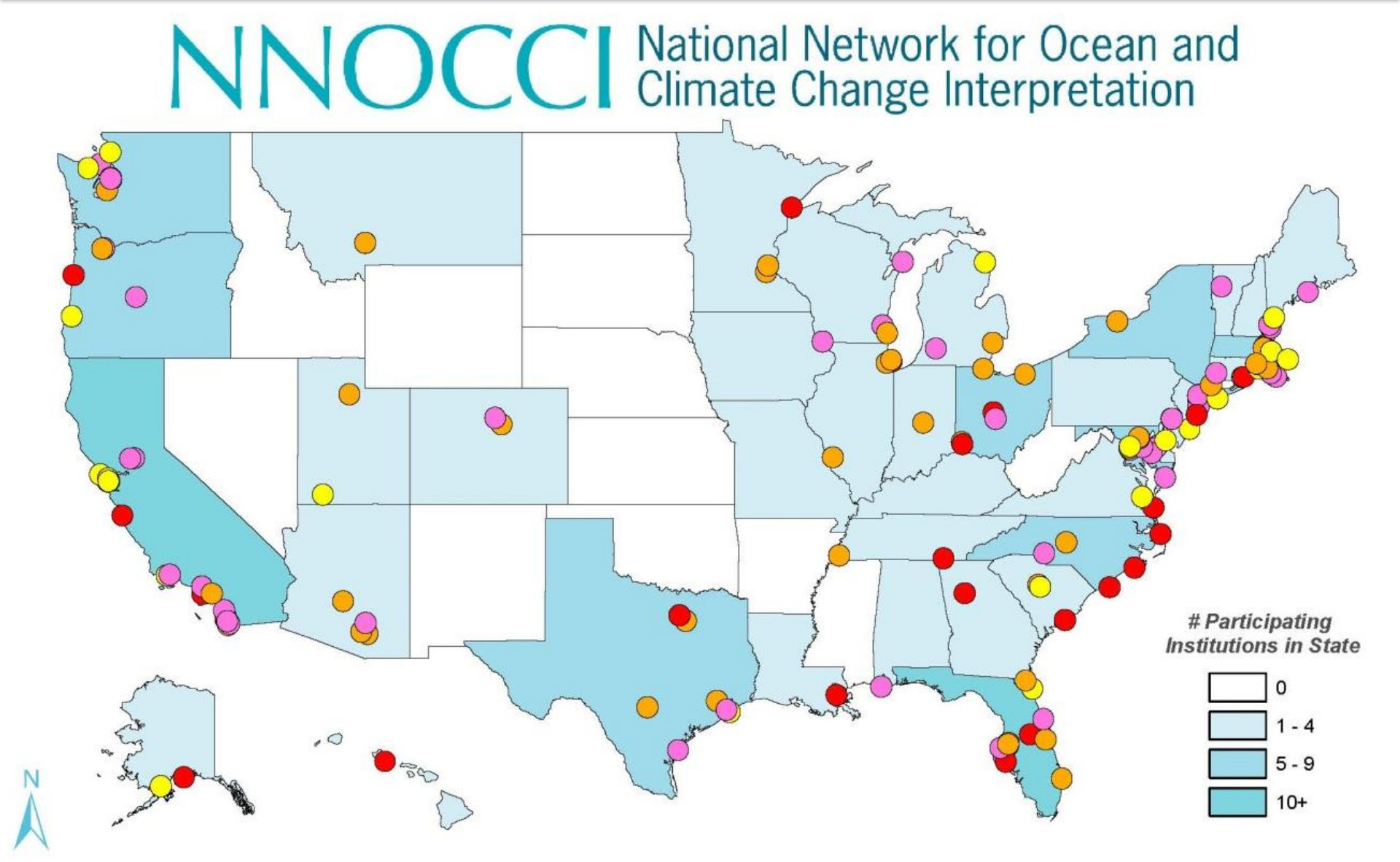
Mieke Van Zundert, A *family dinner in Auver sur Oise.*

Successful communication

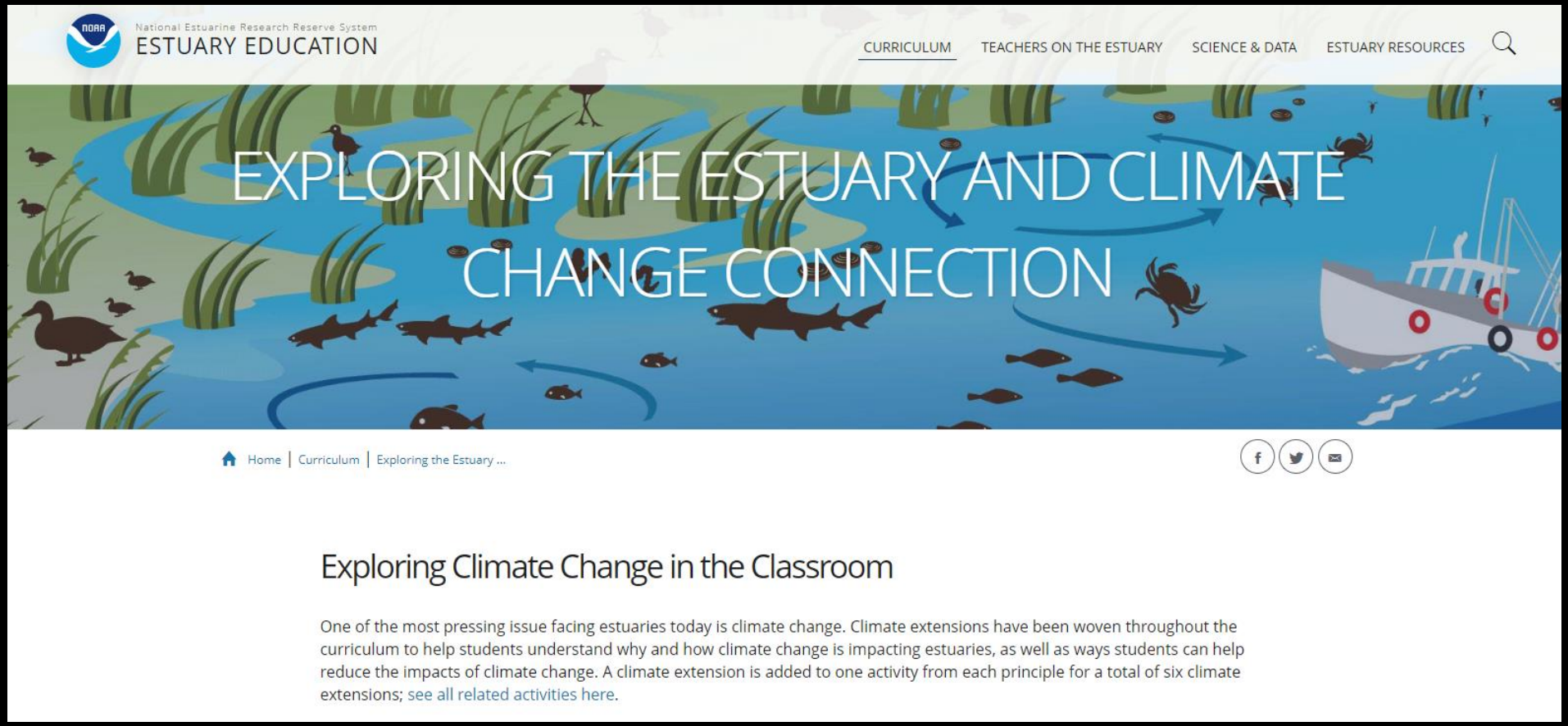
- Common values
- Quality of life
- Local
- Personal experiences & stories

Solutions - individual & civic

Community of practice



Resources


National Estuarine Research Reserve System
ESTUARY EDUCATION
CURRICULUM
TEACHERS ON THE ESTUARY
SCIENCE & DATA
ESTUARY RESOURCES
EXPLORING THE ESTUARY AND CLIMATE CHANGE CONNECTION
Home | Curriculum | Exploring the Estuary ...
Exploring Climate Change in the Classroom
One of the most pressing issue facing estuaries today is climate change. Climate extensions have been woven throughout the curriculum to help students understand why and how climate change is impacting estuaries, as well as ways students can help reduce the impacts of climate change. A climate extension is added to one activity from each principle for a total of six climate extensions; see all related activities here.

Be creative!

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* San Diego, 2050 is Calling. How Will We Answer? (2014). The San Diego Foundation. http://www.sandiego.edu/2050/index.html

** Sass, Jennifer; Rosenberg, Daniel (Oct 2011). *The Delay Game: How the Chemical Industry Ducks Regulation of the Most Toxic Substances.* Natural Resources Defense Council.

*** *Visually depicting the disconnect between climate scientists, media and the public* (2010). Skeptical Science. https://www.skepticalscience.com/visual-disconnect-between-scientists-media-public.html